

## CLAIMS

What is claimed is:

1. An infrared communications system comprising:

5 a multi-beam transmitter for producing an array of diffusing spots upon  
a reflecting surface; and

a receiver comprising a plurality of receiving elements;

wherein each said receiving element has an independent field of view  
that is in line of sight of at least one of said diffusing spots.

10 2. The communications system of claim 1, wherein said reflecting  
surface is a ceiling of a room.

3. The communications system of claim 1, wherein said array is in  
the form of a regular grid.

15 4. The communications system of claim 3, wherein said grid of  
diffusing spots is formed via the emission from said transmitter of a plurality of  
collimated beams of equal intensity.

5. The communications system of claim 1, wherein said diffusing  
spots are approximately equidistantly positioned from one another.

6. The communications system of claim 1, wherein the transmitter  
comprises a light source, collimating optics, and a spot array generator.

20 7. The communications system of claim 6, wherein the spot array  
generator is a holographic optical element.

8. The communications system of claim 1, wherein each said  
receiving element comprises a band-pass filter, a concentrator and a  
phtodetector.

9. The communications system of claim 1, wherein each said receiving element is aimed in a different direction.

10. The communications system of claim 1, wherein said receiver is a multi-branch receiver.

5 11. The communications system of claim 1, wherein each said receiving element comprises a curved holographic mirror.

12. A method of infrared communications comprising:

producing an array of diffusing spots upon a reflecting surface; and

10 receiving signals from at least one of said diffusing spots through a plurality of receiving elements, wherein each said receiving element has an independent field of view that is in line of sight of at least one of said diffusing spots.

13. The method of infrared communication of claim 12, wherein said reflecting surface is a ceiling of a room.

15 14. The method of infrared communication of claim 12, wherein said array is in the form of a regular grid.

15. The method of infrared communication of claim 14, wherein said grid of diffusing spots is formed via the emission from said transmitter of a plurality of collimated beams of equal intensity.

20 16. The method of infrared communication of claim 12, wherein said diffusing spots are approximately equidistantly positioned from one another.

17. The method of infrared communication of claim 12, wherein each said receiving element is aimed in a different direction.